AT the meeting of the Dundee Town Council last Thursday, a letter from the directors of the Albert Institute of that town was read by Provost Cox, in which it was stated that a scheme for the erection of a college had been prepared, and the co-operation of the Council in the furtherance of the work was requested. It was proposed to establish a college in Dundee in connection with the St. Andrews University, and that at first the college should be opened with six chairs—namely, English Literature and Logic, Chemistry, Natural Philosophy, Engineering, Natural History or Greek and Latin, and Mathematics. To defray the expense of the erection of the college and to pay the salaries, 150,000*l.* would be required at the outside. If the college should succeed, it was proposed to add the following additional chairs—viz., Mental and Moral Philosophy, Political Economy, Ancient or Modern History, Latin and Greek or Natural History, Geography and Astronomy, and Physical Geography and Navigation. To endow these additional chairs a further sum of 75,000*l.* would be required. It was proposed that the management of the college should be carried on by the courts which at present manage the colleges at St. Andrews, the only addition to the University Courts of St. Andrews being that the following gentlemen should be members of that Court:—The Lord-Lieutenant of Forfarshire, the Convener of the County, the Sheriff and Sheriff-Substitute of Forfarshire, and the Provost of Dundee. The Council expressed themselves gratified at the movement, and while stating that they would be willing to give it their hearty co-operation, they resolved to call a special meeting for the consideration of the whole subject, to be held on Tuesday last. We would remind the organisers of the proposed new college of the great value of sound science-teaching to so important a manufacturing and commercial town as Dundee. There is nothing to hinder the wealthy merchants and manufacturers of Dundee starting a college at least equal to the Newcastle College of Science, and they should not rest until they possess an institution as efficient as Owens College, Manchester. This latter institution ought to be taken as a model, where all the so-called "faculties" are complete; a "College of Science," pure and simple, seems to us a blunder.

THE formal inauguration of the recently completed portions of the Edinburgh Museum of Science and Art is, we believe, to take place on Jan. 14 next, by a grand *conversazione* to be given by the Lord Provost in the Museum building.

A FURTHER instalment (the sixth part) of the new Government Map of Switzerland has recently appeared, containing the sheets Meiringen, Laax, Trons, Ilanz, Greina, Vrin, Andeer, Zweisimmen, Blumlisalp, Peccia, Blasca, and Maggia. Altogether 72 sheets are now published out of the 546 which will be necessary for the completion of the map. Those which have been issued are mainly of the central and north-west portions of the country, and regarding them we can only repeat the opinion that we have already expressed respecting the earlier sheets, namely, that they are equal and in some features superior to any maps of the kind that have yet appeared. Great as the cost of this map will be to the nation, we have no doubt that its expense will be repaid many times, in the facilities which it will afford in the construction of roads and railroads, and for many other purposes.

WE take the following from the *Academy*:—Now that the question of the endowment of research is being made so much a subject of discussion, it may interest our readers to learn the following particulars, which we take from the Swedish *Aftonbladet*. About a month since that newspaper drew attention to an appeal for funds made by the botanist Dr. Berggren, who is at present exploring the cryptogamic botany of the mountains of New Zealand. It appears that Dr. Berggren has already made some very valuable explorations, first in Spitzbergen in 1868, then in Greenland in 1870, and now has been sent out to New Zealand with a stipend drawn from a sum of money left by a Herr Lettersted for scientific purposes. Dr. Berggren writes that he has had signal success, especially in discovering species closely analogous to the Arctic forms with which he is familiar, but that his means are at an end. An effort made to induce the Government of Canterbury Province to vote him a sum of money was on the point of succeeding, when an economical frenzy took the Lower Legislative House, and the bill was thrown out. *Aftonbladet* laid these facts before its readers. Almost immediately, the proprietors of another newspaper, *Göteborg's Post*, generously forwarded a large sum towards the prosecution of the work, and private funds came in so rapidly that Dr. Berggren will be able to recommence his valuable explorations directly the next mail reaches New Zealand. This zealous response to the demands of science in so poor a country as Sweden does honour to the intelligence of its people.

A TELEGRAM dated Alexandria, Dec. 8, states that two reconnoitring expeditions, each consisting of eight European and twelve native officers and sixty-three soldiers, have been organised by the Egyptian Government, and have started for the Soudan, with the object of surveying the country between the Nile and the provinces of Darfour and Kordofan. Thence the expeditions will proceed to the Equator, west of the Albert Nyanza. They will repair the wells wherever necessary, and prepare maps, and will also report upon the population, climate, and commerce of the country through which they pass.

A MEETING of the local committee in connection with the recent meeting of the British Association, was held in Belfast on Saturday. The expense incurred has been about 1,800*l.*, leaving a surplus of more than 500*l.*, which the Executive Committee recommend should be divided among various local institutions.

WE would draw attention to a very valuable paper "On the Expediency of Protection for Patents," by Mr. F. J. Bramwell, C.E., F.R.S., published in the *Society of Arts Journal* for Dec. 4.

THE additions to the Zoological Society's Gardens during the past week include two Glaucous Gulls (*Larus glaucus*) from Spitzbergen, presented by Mr. R. E. Beaumont; a Common Raccoon (*Procyon lotor*) from N. America, presented by Mr. T. Trimnell; a Bonnet Monkey (*Macacus radiatus*) from India, presented by Mrs. Phillips; a Solitary Tinamon (*Tinamus solitarius*) from Brazil, received in exchange; three Black-footed Penguins (*Spheniscus demersus*) from S. Africa, purchased; a Capybara (*Hydrochærus capybara*) born in the Gardens.

THE "CHALLENGER" EXPEDITION *

II.

THE following Table, taken from the chart, gives a good general idea of the distribution of the two formations with respect to depth. It cannot of course be taken as exact; the indications were jotted down from the impression of colour given at the time, and there is no hard and fast line between Globigerina ooze and grey ooze on the one hand, and between red clay and grey ooze on the other. This Table gives an average depth of 1,800 fathoms for our soundings in the Globigerina ooze. This is datum of no value, for we only rarely sounded in shallow water, and we know that this formation covers large areas at depths between 300 and 400 fathoms; but the mean maximum depth at which it occurs is important, and that may be taken from the Table as about 2,250 fathoms. The mean depth at which we find the transition grey ooze is 2,400 fathoms, and the mean depth of the red clay soundings is about 2,700 fathoms. The general concurrence of so many observations would go far to prove, what seems now to stand indeed in the position of an ascertained fact, that wherever the depth increases from about 2,200 to 2,600 fathoms, the modern chalk formation of the Atlantic and of other oceans pass into a clay.

* Continued from p 97.

No. of Station.	Nature of the Bottom. Glob. Ooze.	Grey Ooze.	Red Clay.
From Cape Finisterre to Teneriffe.			
I.	1125	...	...
	1975	...	...
II.	470	...	...
	1800	...	...
III.	1000	...	...
VI.	1525	...	...
From Teneriffe to St. Thomas.			
1	1890	...	...
2	1945	...	...
4	2220	...	...
5	...	...	2740
6	...	...	2950
7	...	...	2750
8	...	...	2800
9	...	...	3150
10	...	...	2720
11	...	...	2575
12	2025	...	...
13	1900	...	...
14	1950	...	...
15	...	...	2325
16	...	...	2435
17	...	...	2385
18	...	...	2675
19	...	...	3000
20	...	...	2975
21	...	...	3025
22	1420	...	...
23	450	...	...
From St. Thomas to Bermudas.			
25	...	3875	...
26	...	2800	...
27	...	2960	...
28	..	...	2850
29	...	...	2700
30	...	...	2600
31	...	2475	...
32	...	2250	...
...	...	1820	...
From Bermudas to Halifax.			
37	...	2650	...
38	...	2600	...
39	...	2850	...
42	...	2425	...
44	...	1700	...
From Halifax to Bermudas.			
50	...	1250	...
51	...	2200	...
52	...	2800	...
53	...	2650	...
54	...	2650	...
55	...	2500	...
From Bermudas to the Azores.			
58	...	1500	...
59	...	2360	...
60	...	2575	...
61	...	2850	...
62	...	2875	...
63	...	2750	...
65	...	2700	...
66	...	2750	...
67	...	2700	...
68	...	2175	...
69	...	2200	...
70	1675	...	...
From Bermudas to the Azores (continued).			
71	1675	...	...
72	1240	...	...
73	1000	...	...
74	1350	...	...
76	900	...	...
From the Azores to Madeira.			
78	1000	...	...
79	2025	...	...
80	2660	...	...
81	2675	...	...
82	2400	...	...
83	1650	...	...
From Madeira to Cape Verde Islands.			
86	2300	...	...
88	2300	...	...
89	2400	...	...
90	2400	...	...
91	2075	...	...
92	1975	...	...
From the Cape Verde Islands to St. Paul Rocks.			
95	2300	...	...
97	2575	...	...
98	1750	...	...
102	...	2450	...
104	...	2500	..
105	...	2275	...
106	1850	...	...
107	1500	...	...
108	1900	...	...
From the St. Paul Rocks to S. Salvador.			
110	2275	...	...
111	2475	...	...
112	2200	...	...
115	2150	...	...
116	2275	...	...
From S. Salvador to Tristan d'Acunha.			
129	...	...	2150
130	...	...	2350
131	2275	...	...
132	2050	...	...
133	1900	...	...
134	2025	...	...
From Tristan d'Acunha to the Cape of Good Hope.			
137	...	...	2550
138	...	...	2650
139	...	2325	...
140	...	1250	...
From the Cape of Good Hope to Kerguelen Island.			
143	1900	...	...
144	1570	...	...
146	1375	...	...
147	1600	...	...
From Kerguelen Island to Melbourne.			
158	1800	...	...
159	2150	...	...
160	...	...	2600

The nature and origin of this vast deposit of clay is a question of the very greatest interest; and although I think there can be no doubt that it is in the main solved, yet some matters of detail are still involved in difficulty. My first impression was that it might be the most minutely divided material, the ultimate sediment produced by the disintegration of the land, by rivers and by the action of the sea on exposed coasts, and held in suspension and distributed by ocean currents, and only making itself manifest in places unoccupied by the Globigerina ooze. Several circumstances seemed, however, to negative this mode of origin. The formation seemed too uniform; whenever we met with it it had the same character, and it only varied in composition in containing less or more carbonate of lime.

Again, we were gradually becoming more and more convinced that all the important elements of the Globigerina ooze lived on the surface; and it seemed evident that so long as the conditions on the surface remained the same, no alteration of contour at the bottom could possibly prevent its accumulation; and the surface conditions in the Mid-Atlantic were very uniform, a moderate current of a very equal temperature passing continuously over elevations and depressions, and everywhere yielding to the townet the ooze-forming foraminifera in the same proportion. The Mid-Atlantic swarms with pelagic mollusca, and in moderate depth the shells of these are constantly mixed with the Globigerina ooze, sometimes in number sufficient to make up a considerable portion of its bulk. It is clear that these shells must fall in equal numbers upon the red clay, but scarcely a trace of one of them is ever brought up by the dredge on the red clay area. It might be possible to explain the absence of shell-secreting animals living on the bottom, on the supposition that the nature of the deposit was injurious to them; but then the idea of a current sufficiently strong to sweep them away is negatived by the extreme fineness of the sediment which is being laid down; the absence of surface shells appears to be intelligible only on the supposition that they are in some way removed.

We conclude, therefore, that the "red clay" is not an additional substance introduced from without, and occupying certain depressed regions on account of some law regulating its deposition, but that it is produced by the removal, by some means or other, over these areas of the carbonate of lime, which forms probably about 98 per cent. of the material of the Globigerina ooze. We can trace, indeed, every successive stage in the removal of the carbonate of lime in descending the slope of the ridge or plateau when the Globigerina ooze is forming to the region of the clay. We find, first, that the shells of pteropods and other surface mollusca, which are constantly falling on the bottom, are absent, or if a few remain they are brittle and yellow, and evidently decaying rapidly. These shells of mollusca decompose more easily and disappear sooner than the smaller and apparently more delicate shells of rhizopods. The smaller foraminifera now give way and are found in lessening proportion to the larger; the coccoliths first lose their thin outer border and then disappear, and the clubs of the rhabdoliths get worn out of shape and are last seen under a high power as infinitely minute cylinders scattered over the field. The larger foraminifera are attached, and instead of being vividly white and delicately sculptured, they become brown and worn, and finally they break up, each according to its fashion; the chamber-walls of Globigerina fall into wedge-shaped pieces, which quickly disappear, and a thick rough crust breaks away from the surface of Orbulina, leaving a thin inner sphere, at first beautifully transparent, but soon becoming opaque and crumbling away.

In the meantime the proportion of the amorphous "red clay" to the calcareous elements of all kinds increases until the latter disappear, with the exception of a few scattered shells of the larger foraminifera, which are still found even in the most characteristic samples of the "red clay."

There seems to be no room left for doubt that the red clay is essentially the insoluble residue, the *ash*, as it were, of the calcareous organisms which form the Globigerina ooze after the calcareous matter has been by some means removed. An ordinary mixture of calcareous foraminifera with the shells of pteropods, forming a fair sample of Globigerina ooze from near St. Thomas, was carefully washed and subjected by Mr. Buchanan to the action of weak acid; and he found that there remained after the carbonate of lime had been removed, about one per cent. of a reddish mud consisting of silica, alumina, and the red oxide of iron. This experiment has been frequently repeated with different samples of Globigerina ooze, and always with the result that a small proportion of a red sediment remains which possesses all the characters of the red clay.

In the Globigerina ooze siliceous bodies, including the spicules of sponges, the spicules and tests of radiolarians, and the frustules of diatoms occur in appreciable proportion; and these also diminish in number, and the more delicate of them disappear in the transition from the calcareous ooze to the red clay.

I have already alluded to the large quantity of nodules of the peroxide of manganese which were brought up by the trawl from the red-clay area on the 13th of March. Such nodules seem to occur universally in this formation. No manganese can be detected in the Globigerina ooze; but no sooner has the removal of the carbonate of lime commenced than small black grains make their appearance, usually rounded and mammillated on the surface, miniatures, in fact, of the larger nodules which abound in the clay; and at the same time any large organic body, such as a shark's tooth, that may happen to be in the ooze is more or less completely replaced by manganese; and any inorganic body, such as a pebble or a piece of pumice, is coated with it as a fine black mammillated layer. It is not easy to tell what the proportion of manganese in the red clay may be, but it is very considerable. At station 160, on the 13th of March, the trawl brought up nearly a bushel of nodules from the size of a walnut to that of an orange, but these were probably the result of the sifting of a large quantity of the clay. The manganese is doubtless set free like the iron by the decomposition of the organic bodies and tests. It is known to exist in the ash of some algæ to the amount of four per cent.

The interesting question now arises as to the cause and method of the removal of the carbonate of lime from the cretaceous deposit, and on this matter we are not yet in a position to form any definite conclusion.

One possible explanation is sufficiently obvious. All sea-water contains a certain proportion of free carbonic acid, and Mr. Buchanan believes that he finds it rather in excess in bottom-water from great depths. At all events the quantity present is sufficient to convert into a soluble compound, and thus remove a considerable amount of carbonic lime. If the balance of supply be very delicately adjusted, it is just conceivable that the lime in the shells in its fine state of subdivision having been attacked by the sea-water from the moment of the death of the animal, may be entirely dissolved during its retarded passage through the half mile or so of water of increasing density. The bottom-water in these deep troughs has been lost at the surface, a great deal of it in the form of circumpolar freshwater ice; and though fully charged with carbonic acid, it is possible that it may be comparatively free from carbonate of lime, and that its solvent power may thus be greater.

The red clay, or more probably the circumstances which lead to its deposition, seem on the whole unfavourable to the development of animal life. Where its special characters are most marked, no animals which require much carbonate of lime for the development of their tissues or their habitations appear to exist. Our growing experience is, that although animal life is possible at all depths after a certain depth, say 1,500 fathoms, its abundance diminishes. This would seem to indicate that the extreme conditions of vast depths are not favourable to its development: and one might well imagine that the number of shell-building animals might decrease until the supply of lime was so far reduced as to make it difficult for them to hold their own against the solvent power of the water of the sea—just as in many districts where there is little lime, the shells of land and freshwater molluscs are light and thin, and the animals themselves are stunted and scarce.

It seems, however, that neither the extreme depth at which the red clay is found, nor the conditions under which it is separated and laid down, are sufficient entirely to negative the existence of living animals, even of the higher invertebrate orders. In several of the hauls we brought up holothurids of considerable size, with the calcareous neck-rings very rudimentary, and either no calcareous bodies in the test or a mere trace of such. Nearly every haul gave us delicate branching Bryozoa with the zooëcium almost membranous. One fortunate cast, about 150 miles from Sombrero, brought up from a depth of 2,975 fathoms very well-marked red mud, which did not effervesce with hydrochloric acid. Entangled in the dredge, and imbedded in the mud, were many of the tubes of a tube-building annelid, several of them 3 in. to 4 in. long, and containing the worm, a species of Myriochele, still living. The worm-tubes, like all the tests of foraminifera from the same dredging, were made up of particles of the red clay alone.

It seems evident, from the observations here recorded, tha *clay*, which we have hitherto looked upon as essentially the product of the disintegration of older rocks, may be under certain circumstances an organic formation like chalk; that as a matter of fact, an area on the surface of the globe, which we have shown to be of vast extent, although we are still far from having ascertained its limits, is being covered by such a deposit at the present day.

It is impossible to avoid associating such a formation with the fine, smooth, homogeneous clays and schists, poor in fossils, but showing worm-tubes and tracks, and bunches of doubtful branching things, such as Oldhamia, siliceous sponges, and thin-shelled peculiar shrimps. Such formations more or less metamorphosed are very familiar, especially to the student of palæozoic geology, and they often attain a vast thickness. One is inclined, from this great resemblance between them in composition and in the general character of the included fauna, to suspect that these may be organic formations, like the modern red clay of the Atlantic and Southern Sea, accumulations of the insoluble ashes of shelled creatures.

The dredging in the red clay on the 13th of March was unusually rich. The bag contained examples, those with calcareous shells rather stunted, of most of the characteristic deep-water groups of the Southern Sea, including Umbellularia, Euplectella, Pterocrinus, Brisinga, Ophioglypha, Pourtalesia, and one or two Mollusca. This is, however, very rarely the case. Generally the red clay is barren, or contains only a very small number of forms.

On the 11th of February, lat. 60° 52′ S., long. 80° 20′ E., and March 3, lat. 53° 55′ S., long. 108° 35′ E., the sounding instrument came up filled with a very fine cream-coloured paste, which scarcely effervesced with acid, and dried into a very light impalpable white powder. This, when examined under the microscope, was found to consist almost entirely of the frustules of diatoms, some of them wonderfully perfect in all the details of their ornament, and many of them broken up. The species of diatoms entering into this deposit have not yet been worked up, but they appear to be referable chiefly to the genera Fragilaria, Coscinodiscus, Chætoceros, Asteromphalus, and Dictyocha, with fragments of the separated rods of a singular siliceous organism, with which we were unacquainted, and which made up a large proportion of the finer matter of this deposit. Mixed with the diatoms there were a few small Globigerinæ, some of the tests and spicules of radiolarians, and some sand particles; but these foreign bodies were in too small proportion to affect the formation as consisting practically of diatoms alone. On the 4th of February, in lat. 52° 29′ S., long. 71° 36′ E., a little to the north of the Heard Islands, the tow-net, dragging a few fathoms below the surface, came up nearly filled with a pale yellow gelatinous mass. This was found to consist entirely of diatoms of the same species of that found at the bottom. By far the most abundant was the little bundle of siliceous rods, fastened together loosely at one end, separating from one another at the other end, and the whole bundle loosely twisted into a spindle. The rods are hollow, and contain the characteristic endochrome of the Diatomaceæ. Like the Globigerina ooze, then, which it succeeds to the southward in a band apparently of no great width, the materials of this siliceous deposit are derived entirely from the surface and intermediate depths. It is somewhat singular that diatoms did not appear to be in such large numbers on the surface over the diatom ooze as they were a little further north. This may perhaps be accounted for by our not having struck their belt of depth with the tow-net; or it is possible that when we found it on the 11th of February the bottom deposit was really shifted a little to the south by the warm current, the excessively fine flocculent débris of the diatoms taking a certain time to sink. The belt of diatom ooze is certainly a little further to the southward in long. 80° E. in the path of the reflux of the Agulhas current than in long. 108° E.

All along the edge of the ice-pack—everywhere, in fact, to the south of the two stations, on the 11th of February on our southward voyage, and on the 3rd of March on our return, we brought up fine sand and greyish mud, with small pebbles of quartz and felspar, and small fragments of mica-slate, chlorite-slate, clay-slate, gneiss, and granite. This deposit, I have no doubt, was derived from the surface like the others, but in this case by the melting of icebergs and the precipitation of foreign matter contained in the ice.

We never saw any trace of gravel or sand, or any material necessarily derived from land, on an iceberg. Several showed vertical or irregular fissures filled with discoloured ice or snow; but when looked at closely the discoloration proved usually to be very slight, and the effect at a distance was usually due to the

foreign material filling the fissure reflecting light less perfectly than the general surface of the berg. I conceive that the upper surface of one of these great tabular southern icebergs, including by far the greater part of its bulk, and culminating in the portion exposed above the surface of the sea, was formed by the piling up of successive layers of snow during the period, amounting perhaps to several centuries, during which the ice-cap was slowly forcing itself over the low land and out to sea over a long extent of gentle slope, until it reached a depth considerably above 200 fathoms, when the lower specific weight of the ice caused an upward strain which at length overcame the cohesion of the mass, and portions were rent off and floated away. If this be the true history of the formation of these icebergs, the absence of all land débris in the portion exposed above the surface of the sea is readily understood. If any such exist, it must be confined to the lower part of the berg, to that part which has at one time or other moved on the floor of the ice-cap.

The icebergs, when they are first dispersed, float in from 200 to 250 fathoms. When, therefore, they have been drifted to latitudes of 65° or 64° S., the bottom of the berg just reaches the layer at which the temperature of the water is distinctly rising, and it is rapidly melted, and the mud and pebbles with which it is more or less charged are precipitated. That this precipitation takes place all over the area where the icebergs are breaking up constantly, and to a considerable extent, is evident from the fact of the soundings being entirely composed of such deposits; for the diatoms, Globigerinæ, and radiolarians are present on the surface in large numbers; and unless the deposit from the ice were abundant it would soon be covered and masked by a layer of the exuviæ of surface organisms.

SCIENTIFIC SERIALS

Poggendorff's Annalen der Physik und Chemie, No. 6.—The first paper, by G. Lundquist, On the reflection of light from the outside of isotropic bodies, is reprinted from the "Transactions" of the Royal Society of Upsala.—Dr. H. Brougersma contributes a memoir On the Medium in electrical influence, in which, following up the experiments of Riess, he examines Faraday's theory of electrical induction by polarisation of the medium, and describes in detail the apparatus with which he experimented, tabulates his results, and agrees with Riess's induction as to a direct influx of electricity.—The next article comprises a series of communications from the Mineralogical Institute of the University of Strasburg, in which Paul Groth treats of the crystalline form and thermo-electric properties of smaltine or arsenical cobalt. Its chemical formula is very variable, $R = (Co, Ni, Fe)\ As_2$. Eight samples from different localities, which contribute a better knowledge of the hemihedral forms of the species, are discussed. He concludes that some of the forms hitherto regarded as holohedral are hemihedral forms with parallel sides. As with iron pyrites and cobalt-glance, with which it is isomorphous, one part of the crystal is negative towards copper, while the other half is positive.—Dr. Hintze treats of the chemical composition of leadhillite. Prof. Laspeyres two years ago described a mineral from Iglesias, in Sardinia, under the name of maxite, of which the formula was $5PbSO_4 + 9PbCO_3 + 4PbO + 5H_2O$. M. Bertrand, of Paris, soon after published an account of leadhillite from the same neighbourhood. The author proves that the two minerals are identical, and that the formula of leadhillite is not $PbSO_4 + 3PbCO_3$ as hitherto believed, but $2PbSO_4 + 4PbCO_3 + PbO + 2H_2O$. The next paper, by the same author, is crystallographic researches on the combination of aldehyde with the aromatic hydrocarbons. The chemical composition and crystalline forms are given of ditolyltrichloraethan, diphenyltribromaethan, diphenyltrichloraethylen, diphenyldibromaethan, dimonobromphenyltrichloraethan, &c. All these bodies belong to the monoclinic system.—Dr. A. Arzruni gives a short note on twin-growth in willemite. The next paper by the same author is "Optical researches on the turpentinoelhydrates," which he follows by crystallographic and optical researches on compounds of urea. His last paper is on two isomorphous substances derived from benzol.—F. Zollner prints his important paper on the aggregation and position of the sun-spots, and concludes that they are cooled scoriaceous products.—Dr. Karl Braun contributes studies on the earth's magnetism.—Among the reprinted papers are Dr. Andrews' on ozone and Prof. Wright's on the polarisation of the zodiacal light.

Memorie della Societa Spettroscopisti Italiani, September 1874.—This number contains a paper by Mr. J. N. Lockyer, describing certain phenomena seen when examining the spectrum of the electric light through a mass of sodium vapour in a tube. When this is done, the sodium lines are seen to shade gradually off, sometimes on one side, sometimes on both, the boundary of the shading being curved and sometimes limited by a bright line.—There is also another paper by the same author, On experiments on the absorption of a great thickness of sodium and iodine vapour in a tube 5 ft. long. After mentioning that it had been hitherto assumed that a great thickness of gas causes its radiation, and therefore its absorption, to become more continuous, he states that, on generalising his work, it appears that when the density of a vapour is increased, a continuous spectrum is approached in the case of the metallic elements of low specific gravity by the widening of their lines, and in that of the elements of high sp. gr. by the increase of the number of lines. To test this, the absorption of sodium vapour in a 5 ft. tube was observed, and the D line was found to be no thicker than the same line produced by a test-tube full of the vapour, and the line was thicker than the D-line in the solar spectrum, in which spectrum all the short lines are reversed.—Father Secchi communicates a letter of A. T. Arcimis, detailing observations on the spectra of meteorites. The spectra of all seem to be continuous, but wanting in the violet, that colour of the spectrum predominating according to its colour to the naked eye. The sodium line was visible in the trail of some, as also were the lines of magnesium.—G. De Sisa gives a table of the solar spots observed at Palermo from June to September.—A table of the chromosphere, as seen during February and March last at Palermo, is added to this number.—E. Fergola contributes a lengthy paper on the position of the axis of rotation of the earth with respect to its axis of figure.

SOCIETIES AND ACADEMIES

LONDON

Linnean Society, Dec. 3.—Dr. G. J. Allman, F.R.S., president, in the chair.—Mr. Jas. Brogden, Sir Edmund Buckley, Bart., M.P., Messrs. Jas. Cowherd, P. Duffy, C. C. Dupré, A. M. Ross, and J. W. Silver were severally elected Fellows of the Society.—Prof. Huxley read a paper On the classification of the animal kingdom, which will be found in another column. An interesting discussion followed, in which the President, Mr. Busk, Mr. H. G. Seeley, Mr. Stewart, Dr. Murie, and others took part.

Chemical Society, Dec. 3.—Mr. W. H. Perkins, F.R.S., in the chair.—A paper was read by Mr. S. Lupton On the formulæ of the alums; the next was a notice On the colour of cupric chloride, by Mr. W. N. Hartley, who finds that the crystals of the salt when quite dry have a blue colour, and not a green, as they usually appear when slightly moist.—Papers were also read On the oxidation of the essential oils, Part II. by Mr. C. T. Kingzett; On the purification and boiling-point of methyl hexyl carbinol, by Mr. E. Neison; and a note on the boiling-point of methyl hexyl carbinol, by Dr. C. Schorlemmer, F.R.S.

Zoological Society, Dec. 1.—Dr. A. Günther, F.R.S., in the chair.—A letter was read from the Rev. S. J. Whitmee, of Samoa, stating that he had sent home for the Society some birds and a pair of the Samoan Bat, which had lately been described by Mr. Alston as *Pteropus whitmeei*. Particulars were given as to the habits of the latter.—A communication was read from Mr. Henry W. Piers, of Capetown, containing remarks on some specimens of Gymnetrus in the museum at Capetown.—The Secretary announced that Col. R. S. Tickell, late of H.M. Indian Army, had presented to the Society's library a very finely illustrated MS. work, in seven small folio volumes, on the Ornithology of India.—A communication was read from Mr. J. Brazier, of Sydney, N.S.W., giving descriptions of eleven new species of terrestrial and marine shells from North-east Australia.—A paper, by Messrs. P. L. Sclater and O. Salvin, was read on birds collected by Mr. Whitely in Western Peru, being the eighth communication made by the authors on this subject.—A communication was read from Mr. H. Whitely, containing some further notes on Humming Birds collected by him in High Peru.—Mr. A. G. Butler read a paper in which he gave descriptions of three new species of homopterous insects from various parts of the world.—Mr. A. H. Garrod gave some further particulars on the mechanism of the "shew off" in the Bustards, and described the peculiar structure of the *frenum linguæ* recently noticed in a young male of the Great Bustard.